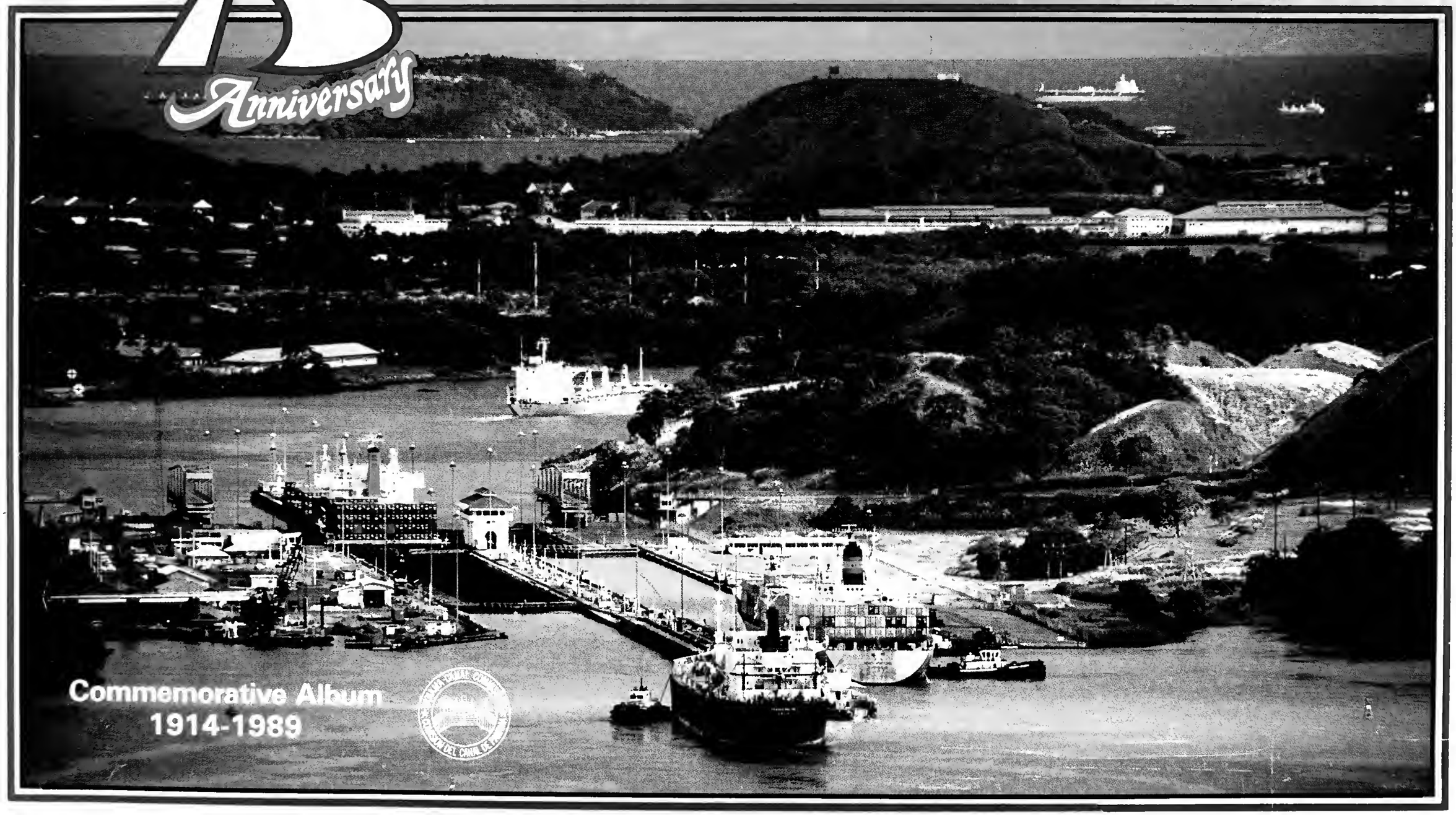
E

PANAMA CANAL

75th Anniversary

HONORING THE PAST BY BUILDING THE FUTURE



Commemorative Album
1914-1989

PANAMA CANAL COMMISSION

BALBOA, REPUBLIC OF PANAMA

ADMINISTRATOR
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DEPUTY ADMINISTRATOR
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DIRECTOR OF PUBLIC AFFAIRS
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The preparation of this special publication by the Office of Public Affairs involved the efforts of many people. Deserving special mention are the photo lab technicians of the Graphic Branch, the Printing Office, the Technical Resources Center, the Language Services Branch, and the Office of Executive Planning. Photographs are by Arthur Pollack, Kevin Jenkins, Armando DeGracia and Don Goode, who also shot the photo of Miraflores Locks that appears on the cover. Kaye Richey created the 75th Anniversary slogan and adapted the album text from the work of Gil Williams and of Richard Wainio of the Office of Executive Planning. Melvin D. Kennedy, Jr., designed the album and served as photo editor. Jaime Gutiérrez created the 75th Anniversary logo and did the album layout. James J. Reid and José S. Alegría Ch. of the Printing Office were invaluable in the layout and typesetting process.

An Official publication af the Panama Canal Commission, April 1989

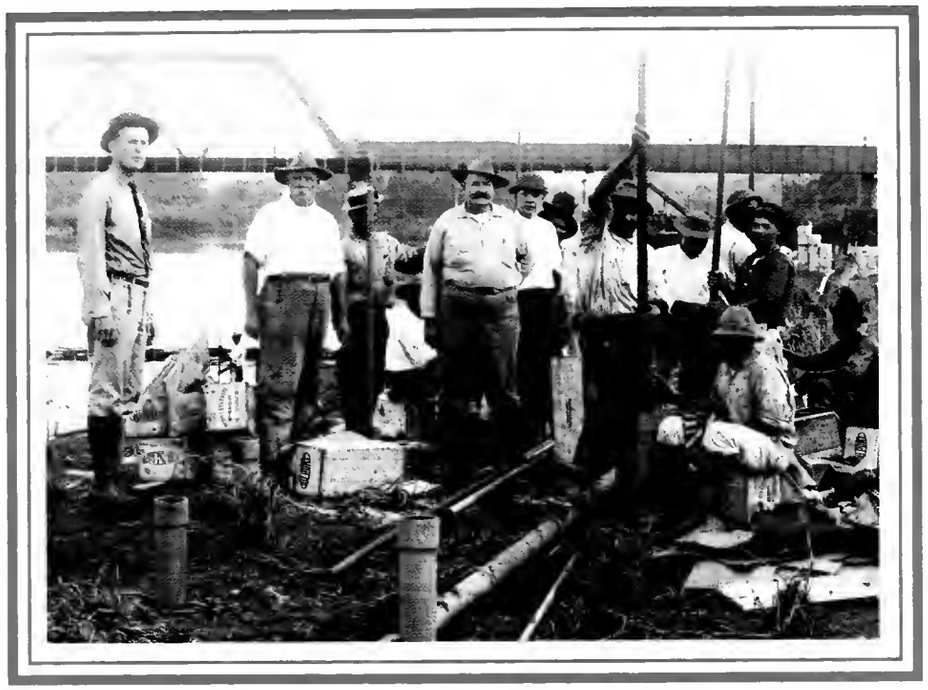
Deputy Administrator on the 75th Anniversary of the Panama Canal

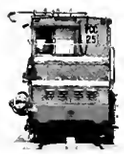
HONORING THE PAST BY

This commemorative album is the third such publication in the history of the Panama Canal. The first was printed in 1939 on the Silver Anniversary of the waterway and the second in 1964 on the Golden Anniversary. The celebration of the Diamond Jubilee of the Canal is a celebration of the Canal's ability to respond to change, with emphasis on today's ongoing improvements that will extend into the future the Panama Canal's long tradition of service to world shipping.

The story of the Panama Canal has always been a story of change: a fundamental change in the world's geography, the tremendous growth of traffic through the Canal as international trade grew between ports served by the Canal, change in the type and size of ships as shipping technology advanced and became more specialized, and responsive changes in the Canal.

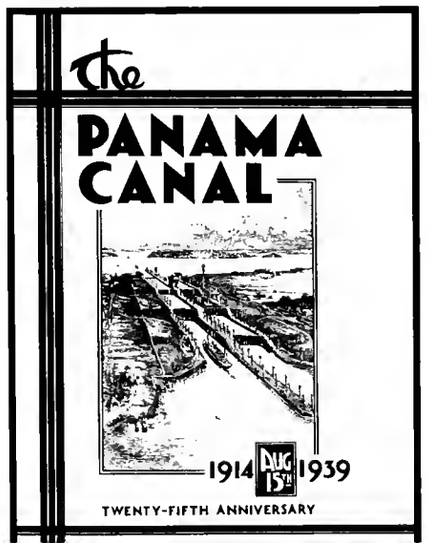
Like the ancient Roman deity Janus, god of doorways and beginnings, this album looks both backward to the past and forward to the future, a future the Canal faces with confidence. After all, what better way to honor the past than by building the future? This concept provides the theme for this album as well as for other activities, as the Panama Canal celebrates this significant milestone in its history.

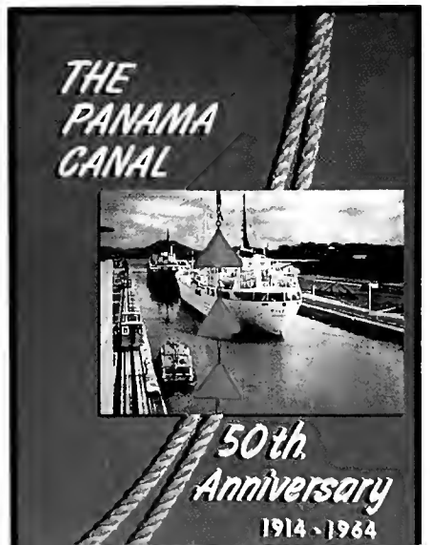




Above: ***Gamboa Dike, October 1913. The faces in this dynamite gang, the most carefully selected of all work teams, reflect the variety of nationalities that worked together to build the Panama Canal.***

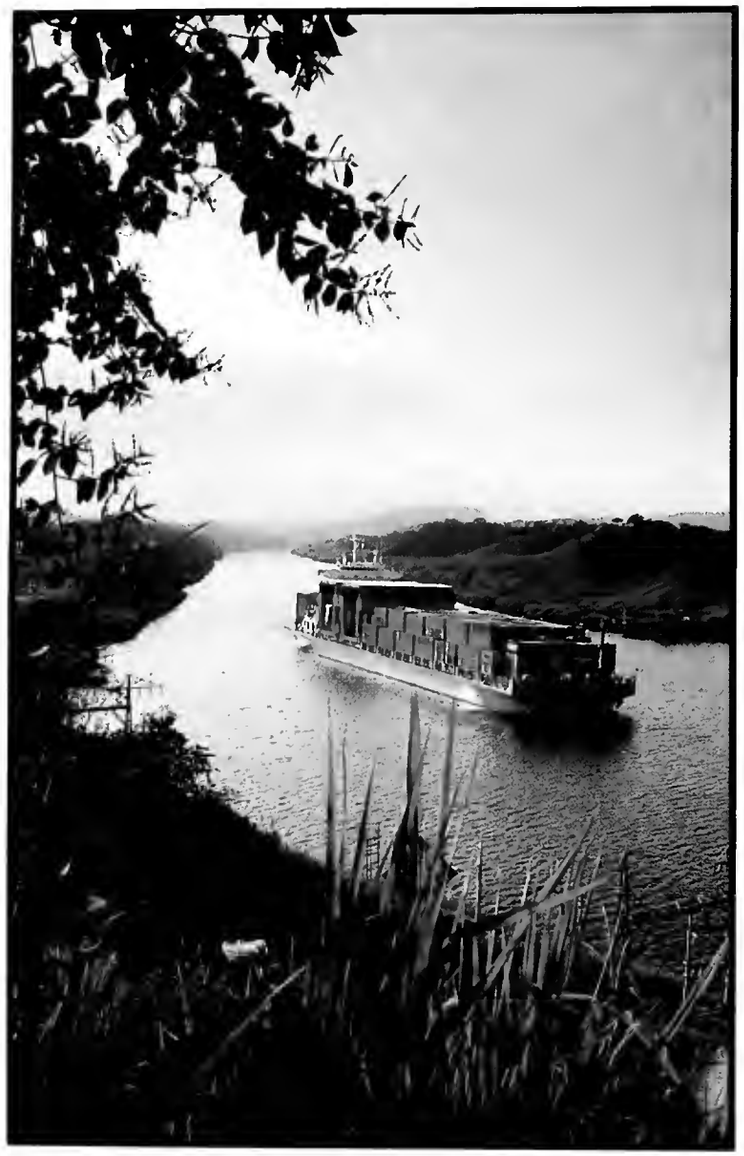
Right: ***The covers of the commemorative booklets published for the 25th and 50th anniversaries.***





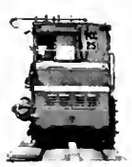
BUILDING THE FUTURE

Overall: ***The Panama Canal's state-of-the-art Marine Traffic Control Center. A sophisticated communications network, and closed circuit television monitors all along the Canal, provide controllers with real-time information on the progress of traffic, and permit tight coordination with pilots.***
Inset opposite: ***The building of tomorrow's schedule, with its complex interactions between northbound and southbound ships, requires schedulers with years of hands-on experience.***
Inset above: ***Marine Traffic Control keeps the pilot abreast of schedule changes as soon as they are made.***



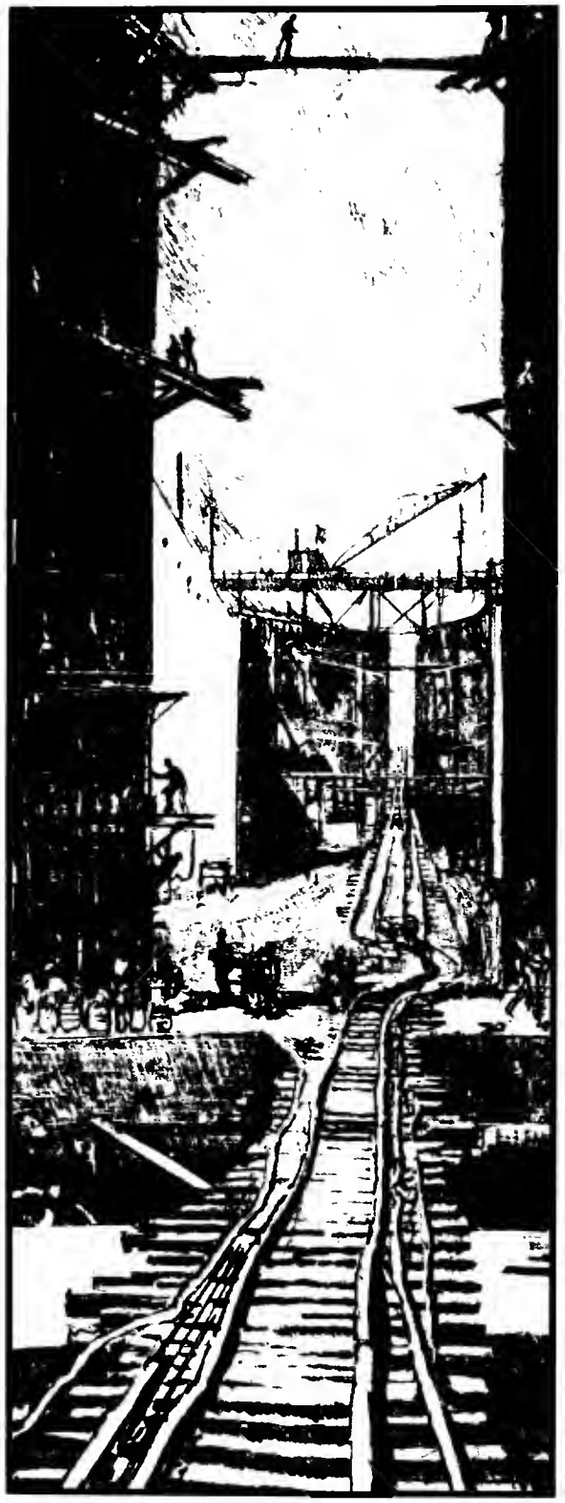
The building of the Canal was an unprecedented engineering triumph and the product of almost superhuman endeavor. It is conservatively estimated that at least 75,000 men and women contributed to the work during the ten-year construction period between 1904 and 1914. These Canal builders created:

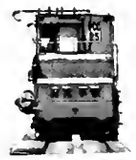
- Gatun Dam, the largest earth dam that had ever been built.
- Gatun Locks, the largest concrete structure that had ever been erected.
- Gatun Lake, the largest artificial lake that had ever been created.
- The healthiest strip of tropical terrain anywhere in the world.
- A water link across fifty miles that were, in the words of author David McCullough, "among the hardest ever won by human effort and ingenuity."



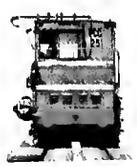
Above: A Panamax vessel transits Gaillard Cut carrying containerized cargo from the west coast of Canada to Europe.
Right: Gaillard Cut, June 1911. Dirt trains from the excavation ran downhill to the Pacific, dumping the spoil to create what is now Balboa, Fort Amador and the Causeway; empty trains returned uphill to continue the cycle.

THE LAND DIVIDED – THE





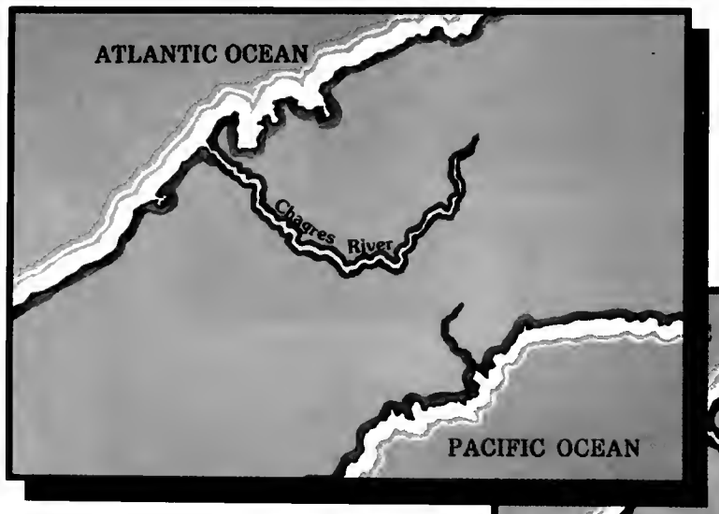
Above: Gatun Locks, July 2, 1910. Visible in the first floor section poured are the 5-foot holes through which water will enter the lock from lateral culverts under the floor.
Below: Gatun Locks, April 15, 1911. The 18-foot high main culverts in the lock walls are visible in the completed sections.

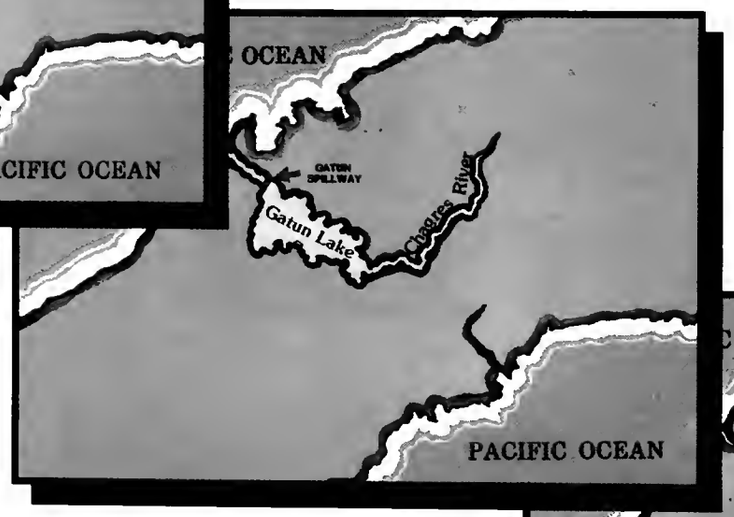


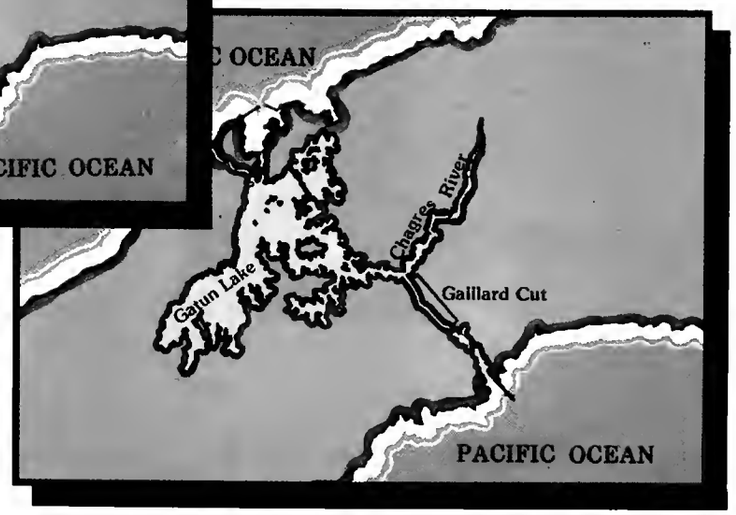
Left: A portion of a 1912 lithograph by Joseph Pennell.
Top: Gatun Locks, March 13, 1913. An experimental locks towing locomotive gets a trial run.
Bottom: August 15, 1914. The SS **Ancon** *eases into Pedro Miguel Locks on the first official transit.*

WORLD UNITED

A sea-level canal across the Isthmus of Panama had been a dream ever since 1513 when the Spanish explorer Vasco Núñez de Balboa crossed from the Atlantic and discovered the Pacific. The Isthmus became an important transit route for gold moving back to Spain from the conquest of Peru. In the 1850's a railroad was built, and in 1882 the French started their effort to build a sea-level canal, but nature opposed them in every way.







Left: ***The creation of Gatun Lake.***
Right: ***An artist's view of the operation of the Panama Canal.***

Of the many lessons learned from the French, perhaps the most important was the need to get the Canal plan into harmony with nature. Instead of digging a ditch all the way across Panama, U.S. engineers adopted an idea that the French had rejected: to dam the Chagres river to create a high-level lake, using giant locks as water stairways to move ships up and down from the lake.

The Chagres was dammed in 1910, and during the four years required for Gatun Lake to reach its full level, work was moving along on the construction of the locks at Gatun, Pedro Miguel and Miraflores. An eight-mile excavation through the continental divide—Gaillard Cut—extended the waters of Gatun Lake to Pedro Miguel Locks.

At the Atlantic end of the lake, Gatun Locks has three steps, for a total lift of some 85 feet. On the Pacific, because the underlying soil could not support a lock as large as Gatun, one step is at Pedro Miguel and the remaining two steps at Miraflores, with a small lake between them. The total lift is the same.

Thus, a transit of the Canal is made with the help of nature all along the way: ships are lifted by water from sea level to lake level, cross the Isthmus on the lake, and are lowered again to sea level, all without the help of a single pump.

MAJOR TRADE ROUTES

To Portobelo and Isthmus de Dios

Las Minas Bay

COLON

Free Zone

Transisthmian Highway

TOBAL

Mount Hope

Margarita

Gatun

Submerged trees

MADDEN LAKE

Madden Dam

Channel centerline navigational aids

N LAKE

Chagres River

Gamboa

Panama Railroad

Barro Colorado Is.

Gaillard Cut

Paraiso

Pedro Miguel Locks

Fort Clayton

Miraflores Lake

Miraflores Locks (Visitor's Pavilion)

Balboa Railroad Station

PANAMA CITY

Pablia Point

Port of Balboa

Rodman

Ancon Hill

BAY OF PANAMA

BALBOA

French Plaza

Bridge of the Americas

Interamerican Highway

Arraijan

PACIFIC OCEAN

Causeway

Naos

Perico

Flamenco

Howard Air Force Base

To the Interior of the Republic

To International Airport

Miraflores Locks

Pilot on bridge

Canal Commission Administration Building

Port of Balboa

Southeast from the Atlantic Ocean
Lake in background

The geographical change wrought by the Canal builders also made possible major world economic changes. Ideally situated to link the far coasts of North and South America with Asia and Europe, the Canal provides mileage savings and the economic advantages of all-water transport.

Over the past 75 years these savings and advantages have played a major role in the development of today's worldwide economy.
This is especially evident in the trade between the East coast of the United States and the Far

East, and along routes between the west coasts of both North and South America and ports on both sides of the Atlantic.

The expansion of world trading relationships has been reflected in the growth in Canal traffic since 1914. In the first full year of operations, 1,058 oceangoing ships transited the Canal; today, more than 12,000 oceangoing ships a year use the Canal.

Left: Miraflores Locks welcomes vessels from all over the world.

OCEAN TO OCEAN IN 8 HOURS

Each of the three locks has two lanes, and traffic can go either way in each lane. Each lock chamber is 1000 feet long and 110 feet wide. Even after 75 years, they can still handle 93% of the world's oceangoing ships.

Currently, the Canal's major cargo is grain (principally corn and wheat moving from the eastern United States to the Far East), followed by petroleum and petroleum products, coal, automobiles, and containerized cargo. Almost 160 million long tons of cargo pass through the Canal annually.

Because the Isthmus of Panama runs roughly east-west, ships traveling from the Pacific to the Atlantic travel generally from southeast to northwest and are referred to as northbound ships; conversely ships headed for the Pacific move southbound.

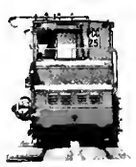
On a transit from the Pacific to the Atlantic, a ship travels at sea level up an eight-mile approach channel to Miraflores Locks, with Pedro Miguel Locks and Gaillard Cut just beyond.

Miraflores Locks from Ancon Hill, with Pedro Miguel Locks and Gaillard Cut beyond.

During its transit of the Canal, a ship is under full navigational control of a Panama Canal pilot. On big ships, additional pilots are assigned to help the command pilot, especially in the exacting task of moving the ship through the locks. Tugs, directed by the pilot, assist in controlling the speed and alignment of the ship. Panama Canal deckhands aboard the ship handle the hawsers from the tugs and the cables from the lock towing locomotives.

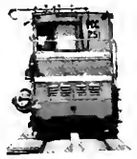
Once hooked to the towing locomotives, the ship moves into the lock under its own power, with the four or six locomotives maintaining the ship steady in the chamber, pulling and braking as directed by the pilot. A lockmaster moves along the lock wall with the ship, coordinating the lock operation with the pilot and the control house operator.

The largest lock gates are 82 feet high. Each of the two gate leaves weighs 800 tons, but they are designed to be buoyant, and they are opened and closed by a 40-horsepower electric motor.

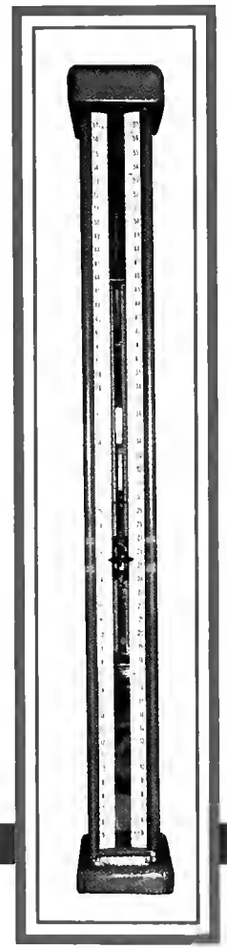


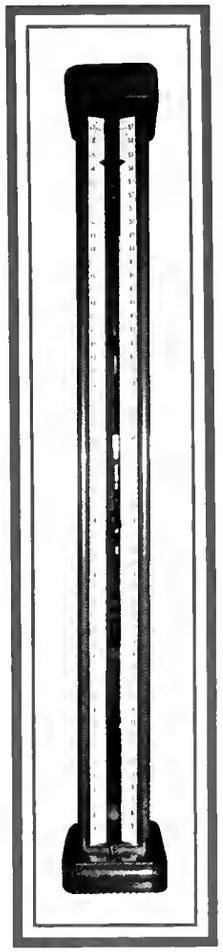
Left: A Panama Canal pilot guides a big ship through Pedro Miguel Locks.
Above: A tug gives a helping nudge to bring a ship parallel to the wall for its entrance into the lock.

Far left: A hand line is thrown from the ship to the waiting boatman, who will tie it to a line attached to the locomotive cable. After the center wall cable is secured on board, the process is repeated for the side wall.
Left: Lock towing locomotives are used to maintain the ship steady in the lock chamber.
Below: Powered by a 40-horse-power electric motor, the 82-feet high gates swing shut behind the ship.



Left: The control board at the locks shows in miniature the position of each gate. The vertical gauges show the height of the water in each chamber.

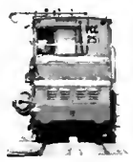




After closing the lock gates, the control house operator opens the giant valves that control the flow of water from the lake into the chamber. Gauges in the control house show the position of the gates and the rising level of water in the lock.

Filling a lock to raise the ship takes about ten minutes. All of the water for lockages comes from the rain-fed lake and flows into and out of the locks by gravity, another example of how the Canal works in harmony with nature.

Once the level of water in the lower and upper chambers has equalized, the gates are opened and the ship moves into the next chamber, and the process is repeated. Each full transit uses about 52,000,000 gallons of lake water.

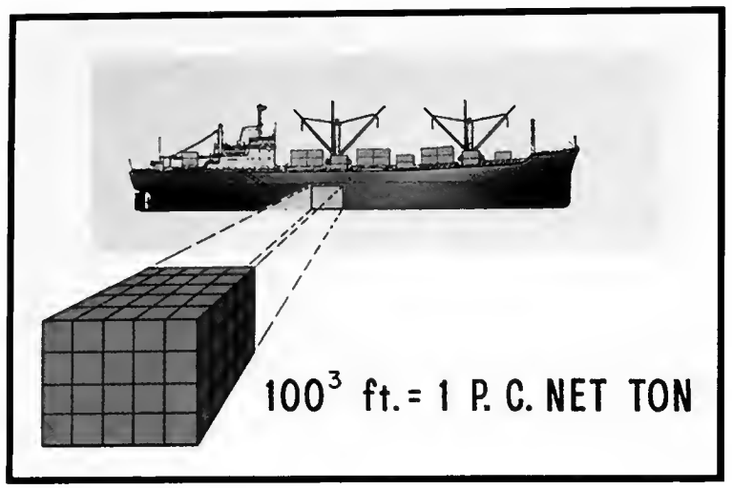


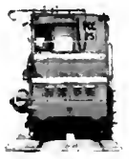
Right: Locking up a step. In each lock chamber the rise is about 27 feet and takes about ten minutes.

Annual rainfall on the Isthmus provides plenty of water for lockages, but has the disadvantage of being concentrated in the rainy season, the eight months between mid-April and mid-December.

In the early 1930's an additional lake—Madden Lake—was created to provide added water storage for dry season lockages as well as to minimize the threat of flash floods during the rainy season. Created by damming the upper Chagres River, it is fed by runoff from a vast tropical rain forest. Because of the vital role of water in Canal operations, and the direct interrelationship between the tropical forest and its rainfall, the Canal's reservoir management system has been kept continually modernized; and the Government of Panama has implemented conservation programs specifically designed to protect the Canal's watershed.

Left: A ship leaves Pedro Miguel Locks at the level of Gatun Lake, moving into Gaillard Cut to begin its journey northbound across the Lake.
Above: Gaillard Cut in the dry season. Little or no rain falls on the Isthmus from mid-December through mid-April.

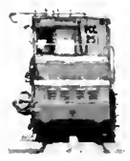




Above: An illustration of the Panama Canal net ton, which is a "ton" in terms of space only. Under this system, whether the space is filled with feathers or coal, toll is charged for a "ton".

On the average, a ship spends less than 24 hours in waiting and transiting time, with actual transit time averaging 8 to 10 hours. The average toll paid is about $27,000. For an additional fee, a ship with a tight schedule can book a reservation in advance and be guaranteed transit for a specific day.

Canal tolls are based on the ship's cargo-carrying capacity, measured in "Panama Canal net tons" equivalent to 100 cubic feet of cargo space. Passenger space is charged on a similar basis. The highest toll ever paid was near $107,000, by the *Queen Elizabeth II*. The smallest toll was 36 cents, paid in 1928 by an American who was permitted to swim the Canal. Other statistics appear on page 18.



Above: A ship of "average" size. Such a ship pays about $27,000 in tolls.
Right: The **Queen Elizabeth II** *transits Miraflores locks during an overhaul of the east lane.*

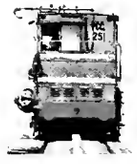
On its transit toward the Atlantic, a northbound ship emerges from Gaillard Cut at Gamboa, where the Chagres river flows into the Canal.

For the 23 remaining miles of the ship's journey across Gatun Lake, the channel generally follows the original bed of the Chagres, winding its way between islands that once were Chagres valley hilltops.

An ongoing program to straighten curves and to lower hilltops for improved pilot visibility is aimed at permitting ships to maintain maximum speed across the lake.

When the ship reaches Gatun Locks at the far side of Gatun Lake, it is lowered to sea level in the Atlantic.

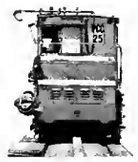
After leaving Gatun Locks, the ship travels out a seven-mile long approach channel to the Atlantic, thus completing its transit.



Left: Looking north into Gatun Lake at Gamboa Reach, from the point where Gaillard Cut ends.
Following page: Gatun Locks, with the Atlantic breakwater and the cities of Cristobal and Colon in the distance. The grassy ridge stretching from the locks toward the left is Gatun Dam. To the right of the locks, beyond the townsite of Gatun, can be seen the unfinished excavation begun in 1939 to construct a third set of locks.

DID YOU KNOW

- That more than four and a half million cubic yards of concrete went into the construction of the Panama Canal's locks and dams?
- That if the material originally excavated to build the Canal were put on a train of flat cars, it would encircle the earth four times?
- That 101 steam shovels, 369 locomotives, 6,163 railroad cars, 9 track shifters, 26 earth spreaders, 20 dredges, 553 drills and 51 cranes, as well as numerous other equipment, were used in the building of the Canal?
- That steam shovel gangs competed to see which could excavate the most dirt each month?
- That in the record-breaking month of March 1912, 3,217 trains hauling 65,555 cars carried dirt out of Gaillard Cut?
- That Gatun Lake contains one and a half million million (1.5 trillion) gallons of water?
- That a ship traveling between New York and San Francisco saves 7,872 miles by using the Panama Canal instead of going around Cape Horn?
- That the lock gates are seven feet thick?
- That the Atlantic entrance to the Canal is 22½ miles west of the Pacific entrance?
- That because of the reclining "S" shape of the Isthmus of Panama the sun rises from the Pacific and sets in the Atlantic?
- That the longest commercial vessels to transit on a regular basis are the *Marchen Maersk* and her sister ships, 964.9 feet long and 105.7 feet in beam?
- That the most transits started in a single day was 65, on February 29, 1968?
- That the fastest transit ever was made in June 1979 when the U.S. Navy hydrofoil *Pegasus* traveled from Miraflores through Gatun Locks in 2 hours and 41 minutes?
- That mean (average) sea level for the Atlantic and Pacific is virtually the same?
- But that because the tidal variation at the Pacific entrance can be up to 18 feet, a sea level canal would be faced with the problem of a current running northbound when the Pacific tide was high and a current running southbound when the tide was low?



June 1915. Early morning in Balboa, while the ice man makes his rounds.

SPECIAL INFORMATION

Additional information about the Panama Canal will be furnished upon request. Inquiries by mail should be addressed to the Panama Canal Commission, 2000 L Street NW, Suite 550, Washington, D.C. 20036-4996, or to the following offices in care of the Panama Canal Commission: APO Miami 34011-5000; by Telex 3034 PCCAMRM PG; FAX 507-52-2122; or by calling the following offices weekdays between 7:15 a.m. and 4:15 p.m., EST.

General Information
Director of Public Affairs
Office of Public Affairs
507-52-3165 (Panama)

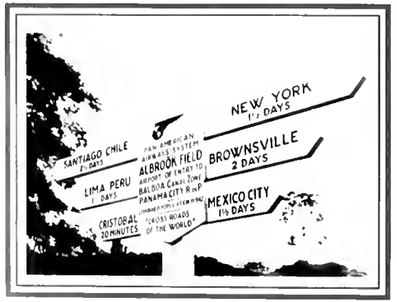
Marine Operations
Marine Director
Marine Bureau
507-52-4500 (Panama)

Economic and Marketing Information
Chief, Economic Research and Marketing Development Div.
Office of Executive Planning
507-52-7961 (Panama)

CHANGES IN THE CANAL'S WORLD-
75 YEARS MAKE A BIG DIFFERENCE

Because the locks look much the same today as they did in 1914, it is easy to forget how much has changed in the 75 years since the Canal opened. In 1914, kitchens had ice boxes, not refrigerators, and ice was delivered in a mule-drawn wagon. But the world was already changing: World War I began in Europe the very same week the Canal opened, and was followed in time by World War II, Korea, and Viet Nam.

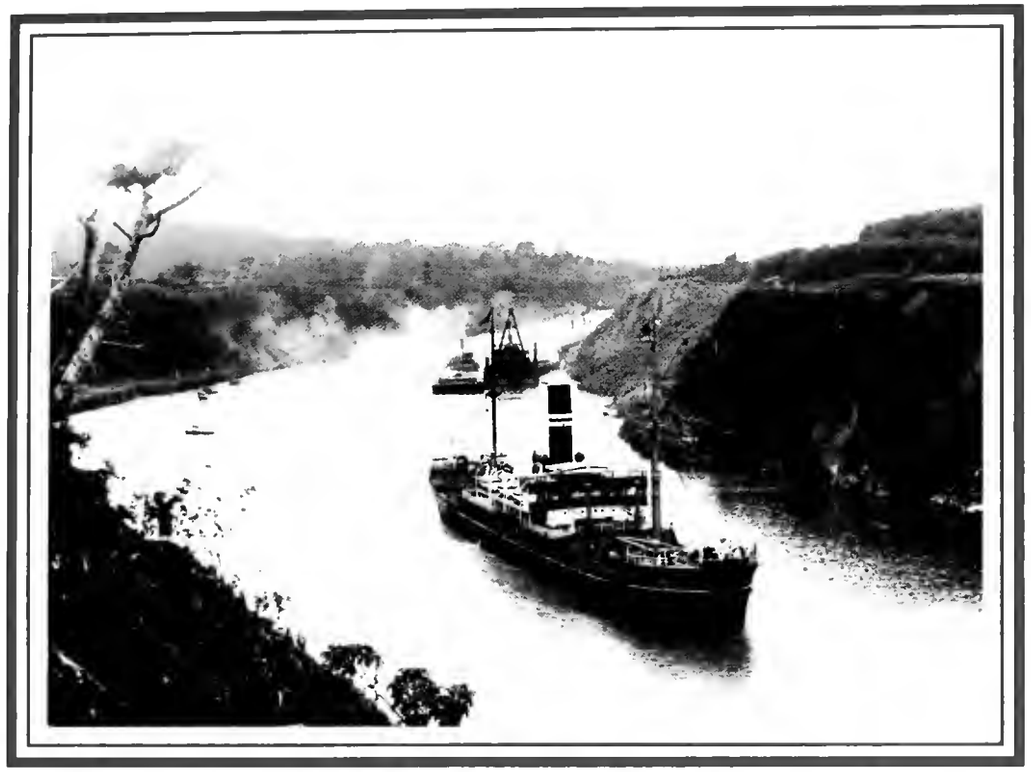
Perhaps more significant than wars have been the social and technological changes: greater equality for women and minorities; a greater political voice for millions; the influence of the automobile, the airplane, radio, television, computers, and communications. Change on top of change, and on the Isthmus of Panama nowhere was it more evident than in the development of Panama City into a modern metropolis.

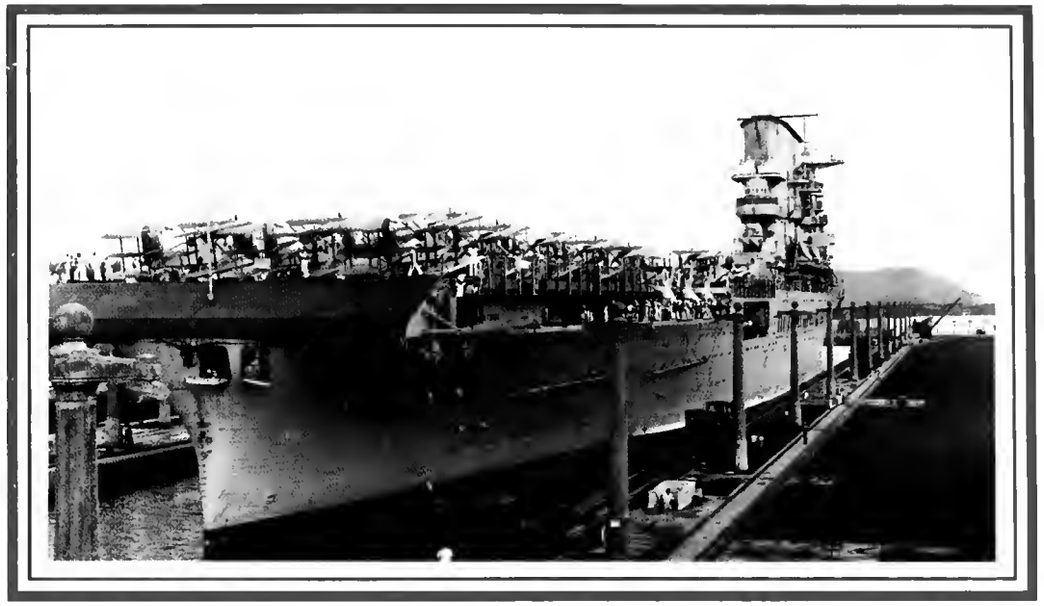


Right: Administration Building parking, November 1922.
Lower left: PAA sign, Balboa, 1935.
Below: Central Avenue, Panama, c. 1940. Note trolley cars, cars driving on the left, and "Gone With the Wind" playing at the Cecilia theater.

CHANGES IN THE SKYLINE

Opposite page: Panoramas of Panama City from Ancon Hill, 1908 and 1969.
Foldout: Panorama of Panama City today.
Above: The Panama Canal Administration Building, with a section of Panama City in the distance.





Left: The Japanese general cargo ship **Chicago Maru** *passes a curve widening project at La Pita, December 2, 1922.*
Above: Biplanes aboard the "aeroplane" carrier USS **Saratoga** *in Miraflores Locks, June 11, 1930.*
Below: Considered a giant ship then, a 96-foot wide bulk carrier passes dredges widening the Cut from 300 to 500 feet, 1968.
Facing page: One of today's giants, **Century Hope** *105.6 feet in beam, with 2.2 feet to spare on either side.*

CHANGES IN THE SIZE AND TYPE OF SHIPS USING THE CANAL

As the number of ships using the Canal grew, they were also increasing in size. After World War II, the evolution of specialized vessels and new methods of cargo handling, particularly the development of container ships, revolutionized the maritime industry.

As ships were changing, so too was the Canal. So much work has been done on the channel—including slide removal and the widening of the Cut from 300 to 500 feet—that more dirt has been removed than was excavated to build it. The Canal acquired faster and more powerful tugs and locomotives, installed bank lights in the Cut and stronger lights at the locks, and improved its operating and overhaul techniques.

CHANGE IN THE NUMBER OF VERY LARGE SHIPS

Today's biggest challenge is the growing number of very large ships transiting the Canal. In 1965, less than 1% of all oceangoing transits were over 100 feet in beam; today more than 24% are over 100 feet in beam. Often referred to as Panamax vessels, they are designed to the maximum size that can safely fit into the 110-foot wide locks.

The advantage to the Canal is that these ships are wonderfully efficient users of the waterway. Because of them, increasing amounts of cargo transit in fewer vessels. If the average vessel size had stayed the same as it was in 1965, it would have taken more than 30,000 ships to carry the tonnage that passed through the Canal last year in just over 12,000 transits.

Left: Locks overhaul in the dry. Each lock chamber is unwatered on a six-year cycle to overhaul lock floors and walls, culverts, and gates.
Right: Locks Division welders strengthen the frame of a lock towing locomotive.

MODERNIZING TO MEET THE CHALLENGE

Panamax ships take more pilots, more skill, more maneuverable tugs, more powerful lock locomotives, and more care. The Canal has succeeded in meeting this challenge by investing more than $100 million annually in accelerated maintenance programs, modernization of the waterway, and streamlining of operations.

More than 20% of the Canal's annual operating budget is spent on maintenance: maintenance of tugs, the locks, towing locomotives, the channel, the dredges that maintain the channel, and all other supporting equipment. Everywhere, machinery is so well maintained it could be said that the Panama Canal runs on oil as well as on water.

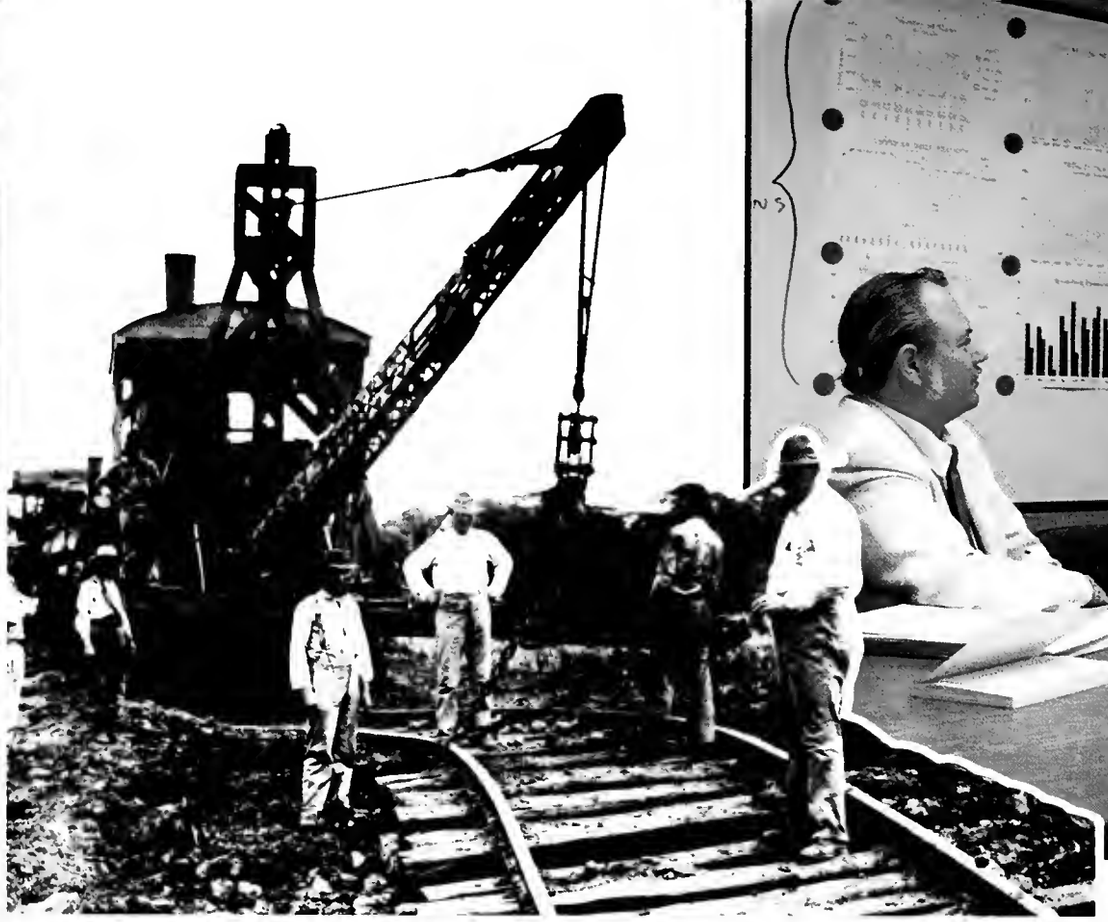
A series of innovative improvements over the years has cut from six months to a matter of days the time a lock lane has to remain out of service for periodic overhaul of lock floors, culverts and gates. During an overhaul, all traffic is funneled through the other lane using accelerated relay lockage techniques.

Efficient transit scheduling and control are indispensable to maximizing the flow of traffic through the Canal. Because very large ships are permitted to transit the Cut only during daylight, and require one-way traffic there, scheduling of traffic through the Cut is the most critical aspect of the complex task of transit scheduling. State-of-the-art computer and communications technology and closed-circuit television provide experienced schedulers and controllers with powerful tools to plan, monitor and control the transit process.

In addition, the installation of high-mast, high-intensity lighting at the locks has effectively extended the hours during which daylight-restricted ships can utilize the locks, and will, when lock approach dredging is completed, permit large ships to use all sections of the Canal at night except the Cut. The new tie-up station in the Cut just north of Pedro Miguel adds capacity for two more ships to wait for daylight or to stand by waiting for traffic to clear the Cut or locks.

Above left to right: the Deputy Administrator and Administrator are briefed on an improved design for a locks locomotive turntable by the Deputy Director, Engineering and Construction Bureau.
Left: Panama Canal divers, skilled in underwater maintenance techniques, practice use of the recompression chamber on the Canal's new $1.4 million diving barge.
Right: Dredging work to widen the approaches to Miraflores Locks will provide additional room for maneuvering Panamax ships.

Above and inset: ***An innovative technique perfected by Panama canal engineers is used to replace locks towing locomotive track and underlying concrete while traffic continues uninterrupted. Part of the work crew has already moved out of the path of the oncoming locomotive. Some 40,000 feet of track has been replaced using this "alternate tie" method.***



Above: ***Track shifter at work, Tabernilla Dump, August 13, 1907. This ingenious device, developed by W. G. Bierd, manager of the Panama Railroad from 1905 to 1907, did the work of 250 men.***
Above right: ***A working group established by the Office of Executive Planning evaluates a computerized study it developed to predict required year-by-year input to the pilot-training programs to meet transit needs through the year 2005.***

Ingenuity and vision have always been part of the Panama Canal tradition. The high caliber of engineering and organization that went into the construction of the Canal has its counterparts throughout the Panama Canal organization, and can be seen in innovative solutions to technical problems as well as in the Canal's continued operational success.

With the development of a variety of transportation alternatives, the Canal organization recognizes that the waterway no longer has the absolute advantage on as many routes as it once had, and must therefore keep the quality of transit service high and maintain tolls at competitive levels. At the same time the Panama Canal Commission is required by U.S. law to operate on a break-even basis, covering all of its costs out of Canal revenues. It has done this successfully since the present, business-type organization was established in 1951, and is committed to continuing its present policy of providing quality service at the lowest possible cost.

As part of the Canal's commitment to long-range planning, additional improvement projects to maintain Canal capacity ahead of transit demand have been identified up to and into the 21st century. Such projections beyond the year 2000 are in keeping with the concept of the Canal as an ongoing enterprise, and is consistent with Panama's goal of maintaining the continuity of operations after it assumes full responsibility for the Canal at the end of 1999.

Consideration is also being given to the major step of widening the Cut even further to permit two-way transit of Panamax-size ships. As with all improvements, traffic demand will be a primary consideration.

THE CANAL'S MOST PRECIOUS ASSET

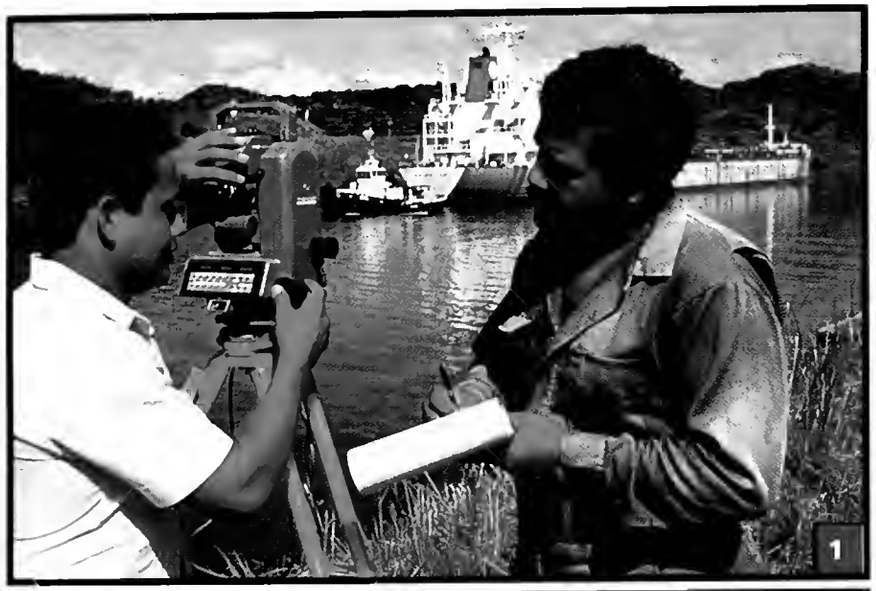
Although machinery is vital, the Canal's most precious asset has been, and will continue to be, its well-trained and dedicated work force.

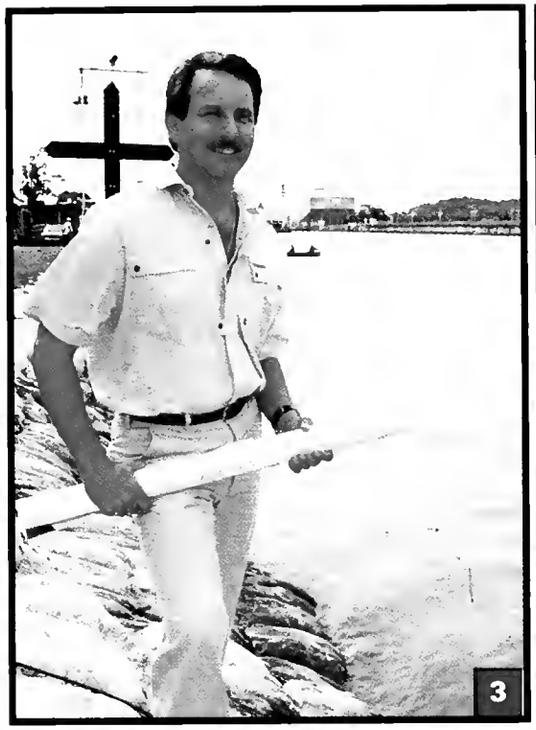
As the Canal organization celebrates its 75th anniversary, honor is due not only to the heroic builders of the Canal, but also to the tens of thousands of men and women who, over the 75 years since opening day, have kept the Canal running. It is they who have built the Canal's reputation for dependable and efficient service.

Today's 7,500 employees, 84% of whom are Panamanian, are part of an unbroken chain of pride in the operation of the Canal that stretches back to August 15, 1914 and beyond, pride that is passed down from individual to individual along with the special know-how that it takes to run the Canal. It is an act of keeping faith with those gone on: with those who built the Canal and those whose stewardship has kept up the Canal's high standards through the years.

"A TRADITION OF EXCELLENCE"

A sampling of talent: (1) Gabriel Polanco, Boatman; (2) Pablo González, Pilot; (3) Rafael V. Barnett, Chief, Pilot Rotation and Scheduling Unit; (4) Frederick Highley, Rigger; (5) Pastora Franceschi, Geologist; (6) Pilots-in-Training, coming on board.





The sample of talent continues: (1) Juan A. Vega, Surveying Technician and Carlos E. Montano, Laborer; (2) Luzcando E. Medina, boilermaker; (3) Luis Alvarado, Supervisory Hydrologist; (4) Patricia Chan, Assistant to the Chief Accountant; (5) Ernesto Reyes, Machinist; (6) Joseph Whittaker and José Espino, towboat engineers; (7) José Claus, towboat mate trainee; (8) Ricardo Clark, Launch Dispatcher.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To assure the continuation of that tradition of employee pride and professionalism, the Canal organization is investing more than $5 million each year for training in the unique skills needed to operate and manage the Canal.

Training reaches across the broad spectrum of Canal occupations: transit operations, the maintenance force, electronic and technical support, computer skills, accounting, and personnel supervision; and ranges from formal classroom training to internship and upward mobility programs, providing employees in-depth, on-the-job experience.

"A TRADITION OF EXCELLENCE"


4


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*Training experiences: (1) **basic electricity for apprentices;** (2) **industrial training;** (3) **hands-on computer learning;** (4) **electronic testing techniques;** (5) **language lab practice;** (6) **seminar for supervisors.***

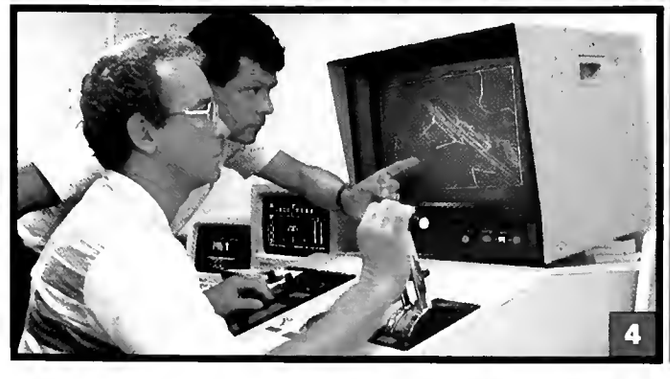

6

Above: ***Close quarters in Pedro Miguel Locks.***

(1) Senior pilot with two pilot trainees; (2) Formal classes on the dynamics of tug assistance; (3) Starting with basics: the engine room; (4) Practicing lock approaches on a computerized shiphandling simulator; (5) Shipboard fire fighting techniques.

Panama Canal pilots are the world's best. Recruited from the ranks of ship masters, tug masters and maritime academy graduates with sea experience, they progress through at least eight years of additional training with the Canal to qualify to pilot the largest ships. Formal class-room seminars familiarize pilots with every inch of the Canal and with its unique rules of the road and navigating conditions, including the effects of tides, weather, and the unusual hydro-dynamics encountered in the narrow confines of the Canal. Hands-on experience in handling every type and size of vessel is now augmented by training on a computerized simulator, bringing high tech to the training process. As the Canal's Maritime Training Unit also trains towboat masters and engineers, teamwork is a major byproduct of the training experience.

"A TRADITION OF EXCELLENCE"



THE PANAMA CANAL'S DIAMOND JUBILEE – CELEBRATING

As a result of its commitment to excellence, the Panama Canal is more capable and efficient today than the day it opened 75 years ago. Its ongoing programs of maintenance, improvement, and employee training guarantee the ability to carry on into the future its proud tradition of providing dependable, safe and economical transit service 24 hours each day, 365 days a year, year after year.

Above: ***The Canal operates under all kinds of weather, 24 hours a day, 365 days a year.***
Facing page: ***Miraflores Locks is an oasis of light in the warm tropic night.***

75 YEARS OF SERVICE TO WORLD SHIPPING